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PATENT APPLICATION

Applicant(s): Christopher Richard Doerr
Serial No.: 10/657,863
Examiner: Doan, Jennifer
Filed: September 9, 2003 Group Art Unit: 2874
Confirmation #: 2072 Case: DOERR 74 (LCNT/125663)
Title: OPTICAL MONITOR AND A METHOD FOR IMPROVED OPTICAL
MONITORING

CERTIFICATE OF MAILING OR TRANSMISSION	
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8/2/05	<i>Laura E. Clatter</i>
Date	LAURA E. CLATTER

MAIL STOP AMENDMENT
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

SIR:

RESPONSE UNDER 37 C.F.R. §1.111

In response to the non-final Office Action mailed May 4, 2005, please consider the above-identified patent application as follows.

The Commissioner is authorized to charge any fees due, including extension of time and excess claim fees, to counsel's Deposit Account No. 20-0782/LCNT/125663.

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IN THE CLAIMS

Please reconsider the claims as follows:

1. (currently amended) An optical monitor, comprising:
a tunable filter for filtering a tapped portion of an optical signal at a predetermined frequency to provide thereby a first filtered optical signal;
a directing means for directing the first filtered optical signal back through the tunable filter to provide thereby a second filtered optical signal; and
a single photodetector for measuring the power of the second filtered optical signal.
2. (currently amended) The optical monitor of claim 1, further comprising an optical coupler for tapping a portion of the optical signal and for directing said second filtered optical signal to said photodetector, wherein said filtered optical signal is directed back through the tunable filter and the optical coupler by said directing means.
3. (currently amended) The optical monitor of claim 2, wherein said optical coupler comprises a 5/95 optical coupler has associated with it a splitting ratio in range from about 1/99 to about 5/99.
4. (currently amended) The optical monitor of claim 2, wherein said optical coupler comprises a multi-section optical coupler.
5. (cancelled)
6. (original) The optical monitor of claim 1, wherein said directing means comprises a mirror.
7. (original) The optical monitor of claim 1, wherein said directing means comprises a Sagnac loop.
8. (currently amended) The optical monitor of claim 1, wherein said directing means is adapted for reducing also substantially eliminates any polarization dependence of [[the]] a reflected portion of the first filtered optical signal.

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9. (original) The optical monitor of claim 8, wherein said directing means comprises a Faraday rotator mirror.
10. (original) The optical monitor of claim 8, wherein said directing means comprises a quarter-wave plate.
11. (currently amended) The optical monitor of claim 1, further comprising a control unit for tuning said tunable filter across [[the]] a frequency band of the optical signal and ~~recording the monitoring said optical power measured by said photodetector as a function of [[the]] a tuning frequency of said tunable filter.~~
12. (original) The optical monitor of claim 1, wherein said tunable filter comprises a plurality of coupled Mach-Zehnder Interferometer filters.
13. (original) The optical monitor of claim 12, wherein each of said Mach-Zehnder Interferometer filters comprises at least one phase shifter.
14. (currently amended) The optical monitor of claim 12 [[1]], wherein said tunable filter comprises seven coupled Mach-Zehnder Interferometer filters.
15. (currently amended) The optical monitor of claim 1 [[14]], wherein said tunable filter comprises an exponential distribution of a free-spectral range from 200 to 12800 GHz.
16. (currently amended) A method of ~~optical~~ monitoring an optical signal, comprising:
a) filtering a tapped portion of [[an]] the optical signal at a predetermined frequency using a frequency tunable filter to provide thereby a first filtered optical signal;
b) substantially eliminating [[any]] polarization dependence of the tapped-first filtered optical signal;
c) reflecting the first filtered optical signal back through the tunable filter to provide thereby a second filtered optical signal; ~~filtering again, the filtered optical signal;~~
d) determining the power of the second filtered optical signal; and

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e) repeating steps a) through d) ~~for each frequency~~ throughout a ~~[[the]]~~ frequency band of the optical signal to determine an optical spectrum of the optical signal.

17. (currently amended) An optical monitor, comprising:

a first means for tapping a portion of an optical signal;

a frequency tunable means for filtering a tapped portion of an optical signal at a predetermined frequency to provide thereby a first filtered optical signal;

a second means for reflecting the first filtered optical signal back through the frequency tunable means for filtering and the first means for tapping to provide thereby a second filtered optical signal; and

a third means for measuring the optical power of [[said]] the second filtered optical signal.

18. (cancelled)

19. (currently amended) The optical monitor of claim 17, wherein the second means is adapted for reducing further comprising a means for substantially eliminating any polarization dependence of [[the]] a reflected portion of the first filtered tapped optical signal.

20. (cancelled)

21. (currently amended) The optical monitor of claim 17, further comprising a forth means for scanning a tuning frequency of said tunable means across ~~[[the]]~~ a frequency band of the optical signal and for ~~recording the~~ monitoring the optical power measured by ~~said measuring means~~ as a function of the tuning frequency of ~~said tunable means~~ for filtering.

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REMARKS

This response is intended as a full and complete response to the non-final Office Action mailed May 4, 2005. In the Office Action, the Examiner notes that claims 1-21 are pending of which claims 1-10 and 12-20 are rejected and claims 11 and 21 are objected to. By this response, Applicant has amended claims 1-4, 8, 11, 14-17, 19, and 21. Claims 5, 18, and 20 have been cancelled without prejudice.

In view of both the amendments presented above and the following discussion, Applicant submits that none of the claims now pending in the application are anticipated or obvious under the respective provisions of 35 U.S.C. §102 and 103. Thus, Applicant believes that all of the pending claims are now in allowable form.

It is to be understood that Applicant, by amending the claims, does not acquiesce to the Examiner's characterizations of the art of record or to Applicant's subject matter recited in the pending claims. Further, Applicant is not acquiescing to the Examiner's statements as to the applicability of the art of record to the pending claims by filing the instant responsive amendments.

OBJECTIONS**SPECIFICATION**

The Examiner has objected to claim 18 as comprising grammatical errors. Applicant has cancelled claim 18.

Therefore, Applicant respectfully requests the objection be withdrawn.

REJECTIONS**A. 35 U.S.C. §102****Claims 1, 2, 4-6, 8, and 16-20**

The Examiner has rejected claims 1, 2, 4-6, 8, and 16-20 as being anticipated by Flanders (U.S. Patent 6,747,793, hereinafter "Flanders"). In response, Applicant has amended claims 1, 2, 4, 8, 16-17, and 19 to more clearly recite aspects of the invention. Claims 5, 18, and 20 have been cancelled without prejudice.

Independent claim 1 (and similarly independent claims 16 and 17), as amended, recites limitations not taught, shown, or suggested by Flanders.

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Flanders teaches a system 100 having an optical amplifier relay integrated with a switching matrix, a pass-through tunable filter 138, and a photodiode 140. An array of optical switches selectively diverts amplified WDM beams 134 to the tunable filter 138 to measure, using the photodiode 140, optical power of a WDM channel (col. 3, lines 49-54; FIG. 1).

However, Flanders does not disclose an optical monitor where an optical signal, after a first pass through a tunable filter, is directed back for a second pass through that tunable filter, and where a photodetector measures optical power of the optical signal after the second pass through the tunable filter, as recited in claims 1, 16, and 17.

"Anticipation requires the presence in a single prior art reference disclosure of each and every element of the claimed invention, arranged as in the claim" (Lindemann Maschinenfabrik GmbH v. American Hoist & Derrick Co., 730 F.2d 1452, 221 U.S.P.Q. 481, 485 (Fed. Cir. 1984) (citing Connell v. Sears, Roebuck & Co., 722 F.2d 1542, 220 U.S.P.Q. 193 (Fed. Cir. 1983)) (emphasis added).

Specifically, Applicant's independent claim 1, as amended, recites:

"An optical monitor, comprising:
a tunable filter for filtering a tapped portion of an optical signal at a predetermined frequency to provide thereby a first filtered optical signal;
a directing means for directing the first filtered optical signal back through the tunable filter to provide thereby a second filtered optical signal; and
a photodetector for measuring the power of the second filtered optical signal."
(emphasis added).

In contrast with Applicant's invention, Flanders teaches the system 100 where a diverted WDM beam 134 passes only once through the tunable filter 138; and the power of the beam 134 is measured by the photodiode 140 after that single pass through the tunable filter 138. Therefore, the Flanders reference fails to teach each and every element of the claimed invention, as arranged in the claim.

As such, Applicant submits that independent claims 1, 16 and 17 are not anticipated by Flanders and fully satisfy the requirements of 35 U.S.C. §102 and are patentable thereunder.

Furthermore, claims 2, 4, 6, 8, and 19 depend directly or indirectly from claims 1, 16, and 17 and recite additional limitations thereof. As such and at least for the same

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reasons as discussed above, Applicant submits that claims 2, 4, 6, 8, and 19 are also not anticipated by Flanders and fully satisfy the requirements of 35 U.S.C. §102 and are patentable thereunder.

Therefore, Applicant respectfully requests the rejection be withdrawn.

B. 35 U.S.C. §103

Claims 3, 7, 9, 10, and 15

The Examiner has rejected claims 3, 7, 9, 10 and 15 as being unpatentable over Flanders and commonly known art (CKA). In response, Applicant has amended claim 1, from which claims 3, 7, 9, 10, and 15 depend, and amended claims 3 and 15 to more clearly recite aspects of the invention.

Independent claim 1, as amended, recites limitations not taught, shown, or suggested by a combination of Flanders and CKA. The patentability of claim 1 over Flanders has been discussed above in Section A.

The CKA cited in the Office Action and including a 5/95 optical coupler, a Sagnac loop, a Faraday rotor mirror, and a quarter-wave plate does not teach Applicant's optical monitor where an optical signal, after a first pass through a tunable filter, is directed back for a second pass through that tunable filter, and where a photodetector measures optical power of the optical signal after the second pass through the tunable filter, as recited in claim 1.

Moreover, the CKA cannot be utilized to modify the system described by Flanders in a manner that would result in the optical monitor recited in claim 1. As such, Flanders and CKA, alone or in a combination, would not produce Applicants' invention recited in claim 1.

The test under 35 U.S.C. §103 is not whether an improvement or a use set forth in a patent would have been obvious or non-obvious; rather the test is whether the claimed invention, considered as a whole, would have been obvious. Jones v. Hardy, 110 USPQ 1021, 1024 (Fed. Cir. 1984) (emphasis added). Moreover, the invention as a whole is not restricted to the specific subject matter claimed, but also embraces its properties and the problem it solves. In re Wright, 6 USPQ 2d 1959, 1961 (Fed. Cir.

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1988) (emphasis added). For at least the reasons discussed above, a combination of Flanders and CKA fails to teach or suggest Applicant's invention as a whole.

Therefore, Applicant submits that claim 1 is not obvious in view of a combination of Flanders and CKA and fully satisfies the requirements of 35 U.S.C. §103 and is patentable thereunder.

Furthermore, claims 3, 7, 9, 10, and 15 depend directly or indirectly from claim 1 and recite additional features thereof. As such, and for at least the reasons discussed above, Applicant submits that claims 3, 7, 9, 10, and 15 are also not obvious in view of a combination of Flanders and CKA and fully satisfy the requirements under 35 U.S.C. §103 and are patentable thereunder.

Therefore, Applicants respectfully request the rejection be withdrawn.

C. 35 U.S.C. §103

Claims 12-14

The Examiner has rejected claims 12-14 as being unpatentable over Flanders in view of Sivarajan et al. (U.S. Patent 5,233,453, hereinafter "Sivarajan"). In response, Applicant has amended claim 1, from which claims 12-14 depend, and amended claim 14 to more clearly recite aspects of the invention.

Independent claim 1, as amended, recites limitations not taught, shown, or suggested by a combination of Flanders and Sivarajan. The patentability of claim 1 over has Flanders been discussed above in Section A.

Sivarajan teaches a method and apparatus for providing optical tuning which use an array 120 comprising Fabry-Perot filters 121, where each Fabry-Perot filter is resonant at its unique wavelength (Abstract: col. 4, lines 19-27).

Therefore, Sivarajan does not teach Applicant's optical monitor where an optical signal, after a first pass through a tunable filter, is directed back for a second pass through that tunable filter, and where a photodetector measures optical power of the optical signal after the second pass through the tunable filter, as recited in claim 1.

Moreover, the Sivarajan cannot be utilized to modify the system described by Flanders in a manner that would result in the optical monitor recited in claim 1. As such, Flanders and CKA, alone or in a combination, would not produce Applicants' invention

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recited in claim 1. As such, a combination of Flanders and Sivarajan fails to teach or suggest Applicant's invention as a whole.

Furthermore, Applicant was unable to locate in Sivarajan any references to Mach-Zehnder interferometers recited in claims 12-14. However, even presence of such references would not affect patentability of Applicant's invention, as recited in claim 1, over a combination of Flanders and Sivarajan.

Therefore, Applicant submits that claim 1 is not obvious in view of a combination of Flanders and Sivarajan and fully satisfies the requirements of 35 U.S.C. §103 and is patentable thereunder.

Furthermore, claims 12-14 depend directly or indirectly from claim 1 and recite additional features thereof. As such, and for at least the reasons discussed above, Applicant submits that claims 12-14 are also not obvious in view of a combination of Flanders and Sivarajan and fully satisfy the requirements under 35 U.S.C. §103 and are patentable thereunder.

Therefore, Applicants respectfully request the rejection be withdrawn.

ALLOWABLE SUBJECT MATTER

The Examiner has objected to claims 11 and 21 as being dependent upon a rejected base claim and indicated that these claims would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Applicant thanks the Examiner for indicating the allowable subject matter with respect to these claims. However, in view of the arguments set forth herein, Applicant believes that amended base claims 1 and 17 (and all intervening claims) are in allowable form and, as such, dependent claims 11 and 21, as they stand now, are therefore in allowable condition. Therefore, Applicant respectfully requests foregoing objections to claims 11 and 21 be withdrawn.

CONCLUSION

Thus, Applicant submits that none of the claims presently in the application are anticipated or obvious under the respective provisions of 35 U.S.C. §102 and §103.

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Accordingly, both reconsideration of this application and its swift passage to issue are earnestly solicited.

If, however, the Examiner believes that there are any unresolved issues requiring adverse final action in any of the claims now pending in the application, it is requested that the Examiner telephone Eamon J. Wall at (732) 530-9404 so that appropriate arrangements can be made for resolving such issues as expeditiously as possible.

Respectfully submitted,

Dated: 8/2/05

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